

## Explanation of Scales for Caltrans Line Styles

### **Base Scale used for development of Line Styles:**

All Caltrans line styles were designed at the default Caltrans metric base scale of 1:500. Placement of line styles at a different metric plotting scale is accomplished by applying an absolute scale factor (example: 0.4 for a 1:200 scale). The scale factor is applied in the Line Styles dialog box or can be done through a macro.

The Caltrans line style resource file (ctlstyle.rsc) will serve both Metric and English projects. Placement of line styles in an English file is also accomplished by applying a scale factor. The line style scale factor is an absolute scale factor (not relative), which uses the 1:500 Metric scale as the basis of the absolute scale factor. A scale factor of (1) represents a Metric plotting scale of 1:500.

### **Scale Factors:**

#### For Metric Projects:

The formula for determining a scale factor is as follows:

$$\text{Scale Factor} = \text{desired scale} / \text{base scale (1:500)}$$

Example 1: for a 1:200 scale drawing

$$\text{Scale Factor} = 200 / 500 = \underline{\underline{0.4}}$$

Example 2: for a 1:1000 scale drawing

$$\text{Scale Factor} = 1000 / 500 = \underline{\underline{2.0}}$$

#### For U.S. Customary Units Projects:

The base scale for English is 1" = 50', which expressed as a ratio is 1:600.

1" = 50' \* 12"/1' which is really a ratio of **1:600**. Use the same formula for Metric Projects but add the Conversion Factor.

$$\text{Scale Factor} = (\text{desired scale} / \text{base scale}) * (\text{Conversion Factor})$$

$$\text{Base scale} = \mathbf{1:500 \text{ (Metric)}}$$

$$\text{Conversion Factor} = \mathbf{3937/1200}$$

Example 3: for a 1"=20' scale drawing (1" = 20' \* 12"/1' = **1:240 ratio**)

$$\text{Scale Factor} = 240/500 * 3937/1200 = \underline{\underline{1.5748}}$$

Example 4: for a 1"=50' scale drawing

$$\text{Scale Factor} = 600/500 * 3937/1200 = \underline{\underline{3.937}}$$

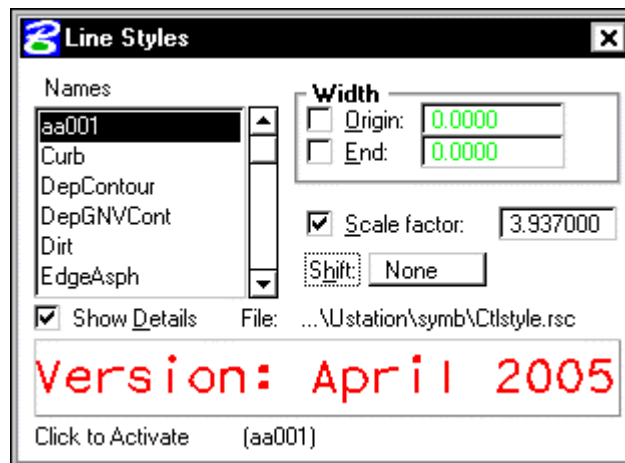
## Procedures for setting Line Style scales

### Starting a new design file:

The new Caltrans English seed files have the line style scale factor set to 3.937. This scale factor represents a 1" = 50' plotting scale for line styles only.

### To check or change the current line style scale factor setting:

- 1) Select "Custom" on the line style pull-down located on the MicroStation Primary Tool Bar.
- 2) Put a check in the "Show Details" box in the "Line Styles" dialog as shown below:



- 3) You should see "Scale Factor checked with a value of "3.937" for files created using a Caltrans English seed file. NOTE; you can check for the latest line style resource version by selecting line style "aa001" which will always be located on the top of the list.
- 4) The scale factor "3.937" represents a scale of 1" = 50', which is the base scale in English units. You will need to change this scale factor if you are working on an English design file being plotted at a different plotting scale. The formula for determining any scale factor is shown on page 1 of this document.

### Table for English Plotting Scales:

Desired Sheet Scale	Line Style Scale Factor
1"=20'	1.574800
1"=50'	3.937000
1"=100'	7.874000

**Table for Metric Plotting Scales:**

Desired Sheet Scale	Line Style Scale Factor
1:200	0.4
1:500	1.0
1:1000	2.0

**Converting the Plotting Scale of Existing Line Styles:**

Changing the scale of existing line styles can be accomplished using the MicroStation key-in “**change linestyle scale <value>**”. This can be applied to either an English or a Metric file. The same scale factors from above are to be used for the same desired scales.

To use the “change linestyle scale” key-in:

- First, select all the line styles that need to be converted (you may use the element selection tool or a fence),
- Second, type “**change linestyle scale <value>**” at the MicroStation key-in. The factor is an absolute value, not a relative value (which means it will change the line style(s) selected to the scale factor applied, regardless of the various scales any of the line styles may have been placed at.

Example 1: for a Metric 1:200 scale, type  
“change linestyle scale **0.4**”

Example 2: for an English 1” = 20’ scale, type  
“change linestyle scale **1.5748**”

**One Exception for One Particular Line Style:**

The line style named “**rd-krail**” needs to be placed at a different scale factor than all other line styles when placed in an English design file. For a 1” = 50’ scale drawing, the scale factor for “rd-krail” is **3.280833.....**. The reason for this different scale factor is; Temporary Railing (Type K) should measure 20 feet when placed in an English design file, not just be proportional to the border sheet (as all other line styles are). Also, Temporary Railing (Type K) should always measure 20 feet, regardless of the plotting scale. This means that the “rd-krail” line style should only be placed at a scale factor of 3.280833 regardless of any English plotting scale utilized.

The concept of placing the “rd-krail” line style at only one scale factor also applies to a Metric design file. A scale factor of (1), which is for a 1:500 scale, is the only scale factor that should be used for “rd-krail” in a Metric design file. This applies regardless of any Metric plotting scale utilized. In a Metric design file, the Temporary Railing (Type K) should measure 6.1 meters at any Metric plotting scale.